

SYSTEM AND METHOD FOR AUTOMATIC OPTIMIZING AND ISSUANCE OF PRIORITIZED RESERVATIONS

5 Field of the Invention

The invention relates to the field of online data management, including acquisition of services automatically.

Background of the Invention

10 Millions of travelers require hotel, automobile and other reservations prior to or during their travels. Moreover, needs exist to change reservations and to respond to new itinerary demands while traveling. Often, particularly in areas where high volumes of travelers exist, such as major cities and metropolitan areas, such travelers cannot obtain a hotel or similar reservation without extensive effort. Although rooms
15 may exist, travelers may not be able to locate any available service for their need. Accordingly a new system to facilitate reservations is needed.

Summary of the Invention

20 The invention relates to a system for constant monitoring, optimizing and instant booking of reservations for services. Elements or components of the invention include: reservation data sorter means for receiving and sorting electronic data signals comprising information describing service availability for selected services; communication means for allowing a user of the system to access the system and for the reservation data sorter means to communicate with the user; and comparison
25 means for comparing the needs of a user accessing the system with the availability of the service in order to achieve an optimum reservation preference at any time the user communicates with the system.

Another embodiment of the invention includes a data processing system executing an application program and containing a database used by the application
30 program. The data processing system comprises CPU means for processing the application program and memory means for storing and deleting rapidly changing data for access by the application program. The memory means comprises a data structure stored in said

memory means, with the data structure including information resident in a database used by the application program and including at least one identifying characteristics data file set stored in the memory means. Each of the data file sets contain information unique to a specific user. At least one preference data file set is stored in the memory means, and each of the data file sets contains information relating to service preferences of a specific user. The memory means also includes a plurality of data files containing constantly updated service availability data from a plurality of service providers. In this embodiment of the invention the data structure allows rapid access to the preference data file and the service availability data files to conduct comparison operations with at least one identifying data file set.

Another embodiment of the invention includes a memory for storing and deleting rapidly changing data for access by an application program being executed on a data processing sub-system. The memory comprises a data structure stored in said memory, at least one identifying characteristics data file set stored in the memory, at least one preference data file set stored in the memory, and a plurality of data files containing constantly updated service availability data from a plurality of service providers.

Another embodiment of the invention includes a method of doing business comprising a remote data sorter for constantly tracking and providing instant service reservations upon user demand. The method comprises the steps of: providing reservation data sorter means for receiving and sorting electronic data signals comprising information describing service availability for selected services; entering data transmission and handling agreements to receive the electronic data signals from the service providers and to allow instant reservations services and constant updating of the data transmitted; configuring communication means for allowing a user of the system to access the system via telephone and for the reservation data sorter means to communicate with the user; and providing comparison means for comparing the needs of a user accessing the system with the availability of the needed service in order to achieve an optimum reservation preference at any time the user communicates with the system and to communicate the optimum reservation preference to the user during the same telephone call that was initiated by the user.

Another embodiment of the invention includes bidding means cooperating with at least the reservation data sorter means for bidding for services initially not

available from a service provider. This allows the user to receive optimized reservations by bidding to a pre-selected level for services made available subject to bidding operations. The system may further include alerts to the user, in various forms, regarding the bidding operation.

Brief Description of the Drawings

Figure 1 is a schematic diagram of the information flow within the systems and methods of the invention.

Figure 2 is a schematic diagram of the information flow within the systems and methods of the invention.

Figure 3 is a schematic flow diagram of the method of information flow within the systems and methods of the invention.

Detailed Description of the Invention

A business method and system of reservations is needed to overcome the extensive problem of people or systems wasting extensive amounts of time awaiting fulfillment of service requests. In one example, travelers represent a class of service requestor. In this example a traveler may be unable to obtain a room reservation, or other travel related service reservation when desired. Indeed, every day there are millions of business people who try to alter or obtain a reservation within only a very short amount of time and are unable to do so or whom must wait excessively while existing systems attempt to meet the person's need. This is due to unavailability of the services they need at the moment they inquire, or due to lack of knowledge of the services which may be available and which could match the need of the traveler. Moreover, it is often necessary to navigate among numerous service providers-expending considerable time and effort in the process. It is recognized that numerous systems, methods, and patents likely exist for reservation systems. However, it is believed that none have identified the methods and technology herein disclosed, and only here is the recognition of the problem accompanied for the first time by a dramatic solution of various embodiments.

Figure 1 illustrates a first embodiment of an invention to facilitate ease of access of a traveler to service needs by providing means for automatically sorting and customizing reservations and service information. System 10 provides communication

means 14 for communicating to reservation data sorter 16, which may be either a centralized or distributed architecture server means for receiving, retaining and/or managing reservation data. In one embodiment, a distributed architecture may utilize hard drives or servers of enrollees in a service program related to this system, or may
5 utilize other storage and processing media. Communication means 14 may include a variety of devices such as but not limited to cellular or other phones, handheld devices having communications capabilities such as handheld personal computers (HPCs), personal digital assistants (PDAs) and the like, and computers such as personal, desktop, laptop or others.

10 In one example, the traveler or user of the system uses their communication means 14 to place a single query, email, or call 18 (collectively this step is referred to herein as a "call 18" without limitation to the type of medium used) to data sorter 16 when a service or reservation is needed. Online queries or automatic routing may connect the user to the correct option for the service needed, e.g. type of service and
15 dates or times. The user may already be an enrollee or registrant for the service, in which case the user's preferences may have already been registered and automatically tracked- awaiting an actual user request. Alternatively, a new member or preference may be entered with a quick entry or a more thorough entry. In any of the above options, after the user has placed the call 18, the user is instantly provided with a reservation or other confirming number for the service that was reserved during that
20 communication, i.e., a reservation number is provided to the user via the data sorter 16 and communication means 14 which facilitates calls, transmissions or data signals 21 back to the user to provide the reservation or confirmation number in virtual real time. A routing system within communication means 14 may be optionally used to
25 store the reservation or confirmation data in a specified data file for easy retrieval. In one embodiment, the routing mechanisms allow automatic placement of the reservation data in a travel folder, chronological or schedule folder as is commonly used, or a data storage location appropriate to the specific service reserved. It is recognized that a pager or other personal digital device capable of receiving such a
30 signal is included herein as well.

In one embodiment, a cell phone capable of establishing precise relational locations and distances to the desired service is utilized with the invention herein. Indeed, phones or other communication means for receiving and transmitting data

using this invention may utilize one or more of various standards or protocols. These include but are not limited to Wireless Application Protocol (WAP), the well-known ISDN and GSM standards, the General Packet Radio Services (GPRS), the Universal Mobile Telecommunications Systems (UMTS) or other variants thereof. Different communication means may also have one or more or various different application and operating systems.

In one embodiment, system 10 relies on a high volume or streams of data 22 that provide signals to reservation data sorter 16, which then maintains a constant update of availability of one or more services. These services are also rapidly prioritizable in order to find best matches with the needs of various users. As the availability of the services change, which is likely to be at all times, then the data is automatically updated. However, in view of the data being readily prioritized or otherwise coded for proper matching according to user preferences or profiles, the system allows for instant access to accurate information while minimizing unnecessary processing operations.

Referring to Figures 1-3, at the moment the user communicates with system 10, the data sorter 16 conducts a rapid best-fit analysis using a comparison subsystem 33, such as by using automatic software-based steps to compare and rate the available services 35 by location with the location, or designated location, of the user to obtain the optimal service according to the particular user preferences or pre-sets, shown schematically within user needs and location database 38. The user may choose to allow an automatic acceptance of a service reservation or may chose to conduct an accept/reject step or steps with the data sorter prior to accepting a proposed reservation. In either option, once the data sorter is authorized to make a best-fit match and to obtain a reservation, then system 10 communicates a structured signal in the form of acceptance 42 to the service provider 25 and user 16 of the service that is consistent with the best-fit analysis or algorithm. In one embodiment, each data stream or signal advising of the availability of a service option (which is coming from a service provider) is bundled or rapidly linkable with a reservation number or similar unique identifier (for example, a "source code" identifying the source of the service) that allows instantaneous acceptance and verification of the reservation and corresponding identifier to the user. In one example, a service provider generated signal identifying the availability of a certain hotel room type may have an embedded

reservation number or numbers. In another example, the service provider generated signal identifies a specific room and includes one or more reservation identifiers to enable instant acceptance of that room by a user call 18. It is noted that this system allows for more precise scheduling of services, and even improved or more specific user preferences to be accommodated instantaneously.

In another embodiment, a network-enabled system includes a server computer hosting unique data transmitted from the remote users and service providers. The system also includes a user communication device providing access to the server having a plurality of data matches for a preference set of services desired by the user.

The server computer provides a user interface whereby the plurality of users are authenticated prior to accessing the matched data; which is also referred to as an optimum reservation preference. During the constantly updating processes of matching the dynamic changing service availabilities with the user preference set of services, the system creates updated user file elements or data strings for selection when a new location of the user is activated by an active communication from the user, which in turn generates a location signal. It is recognized that the data structure and manipulation may vary according to the medium which is used to transmit information such as optimized reservation preferences, registration source codes, and the like. Indeed, various network forms may be used in this invention, i.e. private radio, cellular phone, Internet, etc.

Therefor, system 10 creates an online, constantly updated and accessible, data management system for allowing packaged or specialized signals to be rapidly and remotely accessed either through use of wired or wireless means. Following user access to system 10, a prompt of a best fit for a service need selects the best-fit data for that user and user's location (or interjected desired location) and communicates the matched service to the user, preferably along with a confirmation that the service is then reserved for the user.

In one example, which is only provided for illustration rather than limitation, a user visiting Washington, D.C. may desire to extend her hotel stay after already checking out of her previous hotel. This invention would be quite useful, particularly if the user were busy with meetings. She may then use her cellular phone to access system 10. Her prior registration with a service provider may have been entered through her phone or another data portal (using a communication means) and may

have included a preference for a non-smoking queen size bed in a certain prioritized ranking of hotels or hotel chains or hotel types. She might even designate the type of bed or other feature desired. Her prior registration may also have included the best-fit data of a service within a distance or time of the caller's location at the time of the call. Alternatively, a best-fit analysis may include a bidding bot option and data configuration (shown in Figure 2 as elements 51 for services and 53 for user needs which are designated for bidding operations) to actually bid for biddable hotel rooms in a prioritized manner, when such rooms are not already listed as available. Yet another option may include a location match to find the optimum location according to various user or environmental parameters.

In this example, the reservation data sorter had been receiving constantly updated data transmissions from registered service providers in numerous locations. When the caller communicated with the data sorter, system 10 automatically identified the caller and the caller's location through cell phone identifier or other known means, possibly including query means. Virtually simultaneously, the data sorter also queried the data within the system at the time of the service request and provided best-fit data matching the services available to the user's desires and location. A reservation number was instantly validated with the service provider and communicated directly to the caller- concluding and confirming the reservation transaction. Voice or other means may then activate credit card or other payment information for transfer or qualification of that information to reserve the service.

The entire process will be very rapid, may take less than one minute, and indeed preferably ought to take less than 10 seconds. In other words the process should be very brief, such as from about a few seconds to about a few minutes- but ideally less than about 30 seconds. Service providers may include hotel associations, hotels, hotel chains or restaurants. Other providers may include regional or local business or tourist organizations, municipalities, travel agencies, airlines, trade associations, and online or other travel guide providers or publishers, as well as others in need of such technology. This may even include industry consortiums or other service providers. Indeed, fees for this service might even be payable by the service providers or subscribers, and allow the users of this single point instant wireless reservation system to communicate with the system 10 without charge. Alternatively, certain charges may be billable to the user. For example, certain subscribers may

require a portion of a charge. In another example, if the user decides to employ a biddable option on a service, as will be discussed further herein below, then a certain fee may be charged. Charges for services may be automatically attributable to the appropriate account according to user or subscriber agreement. Use of verification techniques such as a code word or voice analysis may allow further efficiencies during the call 18, and would also provide requisite security for such transactions and confirmation of length of stays or similar particularly relevant data according to the characteristics of the service.

This model recognizes that users (and service subscribers or providers) will often migrate to the simplest and most reliable form of communications. Some of the advantages of this system derive from the ease afforded the traveler by making only one very short-duration phone call, and in some embodiments not even requiring access to a computer or any other non-phone connection to the Internet, World Wide Web or other source of service data. Further advantages include higher efficiencies for service providers, including improved access to travelers and higher utilization rates of their services. Another advantage is to ensure that service providers consisting of large affiliated companies will qualify to function under anti-competitive guidelines due to the availability of this invention as a service option to the user/consumer.

These and other advantages are all achievable by use of a constantly updated system of availability of services throughout one or more vast and integrated networks of service providers, and an algorithmic or other means for rapid matching of the prioritized service(s) needed by a user, and confirming the availability with the specific user's location all within an extremely short time from when the user accesses the system. Certain embodiments may be available for arranging future trip options in different locations in order to provide templates, defaults or other types of pre-sets to the system according to locale, time of year, number of guests accompanying the user or other parameters. These embodiments may use either phone or other communication means to establish or adjust user preferences and profiles.

Additional features may include biometrics means for rapid identification of the user through voice recognition and/or voice generation capabilities, thus automating the rapid validation and payment processes of a user. Moreover, the system is able to provide ease of selection or alteration of the range to the service that

is available (i.e. distance to nearest available hotel or time which the user is willing to wait in order to receive access to a service) by either voice, key or phone number pad direct entry. In this example, a voice analysis or recognition capability is more readily adaptable in view of the phone interface already being suitable for aural input and use as compared with other mediums.

Yet another feature of this system 10 allows for readily available access to current travel or other service information to every user at any time. For example, a user may be reading an online Internet or similar publication or electronic book and may wish to obtain a reservation for travel. This system allows for great ease of access to the available services in a location mentioned in the particular article or e-book being read. An embedded link to the location may connect with this service to allow the reader/user to connect to system 10 reservation data sorter 16 while maintaining their position in their reading material. The overall efficiencies of such a system for travelers will greatly aid in their selection of services. This feature may include a query-only option to allow a user to merely inquire about a service rather than to obtain an instant prioritized reservation.

Figure 3 illustrates the method of the invention in which user preferences 88 and service availabilities 90 are communicated 91 in a time cycle according to the rate of change of either in order to maintain current data in as near to real time as possible. The information is communicated 91 to a database or other comparison subsystem 93 to ascertain best fits of data for transmission upon demand, likely by user action. If a match of the services and needs occurs, the appropriate match validating information is noted 95 and prepared 101 for transmission 104 to user when appropriate. A user accept/reject path 110 may also be appropriate. If a match is not possible, such as at path 113, then further analysis is performed at step 118 at which a bidding operation as described herein is performed to identify a biddable service to match the needs of the user and to commence or request authority to commence bidding operations. If a match is then found, the information is again delivered 122 for formatting and transmission to the user, and the service provider (such as at path 126 or through other channels of reciprocal information sharing). Alternatively, if bidding operations fails to achieve a match or acceptable best fit according to the input criteria of the user and service providers, then appropriate communication 144 is sent to the user. In either a win or loss in a bidding operation between multiple users bidding for the identical

service, then a reward or credit is generated according to defined rules at 163 and is transmitted to an appropriate repository for the users involved.

Accordingly, as noted above, the invention also includes a bidding bot option to actually bid for biddable hotel rooms in a prioritized manner, when such rooms are not already listed as available. This biddable option would allow users to automatically attempt to obtain their preferred service choice, even though there was no initial availability or for other reasons, by attempting to outbid the then current reservation holder for that service. Alternatively the system may automatically command a bidding option, i.e., a bidding bot, either up or down in price with the service provider or its agent, responsive to certain pre-set or other conditions. In this embodiment, the provider of the service would allocate a certain block or amount of services to be eligible for bidding. Then, according to agreed-upon bidding rules, a user could automatically bid a higher price to pay or other parameter (e.g. length of stay, etc.) for the service. Certain scenarios may allow for the biddable option to expire after a certain price or other parameter or milestone is achieved. For example, if a biddable hotel room reached a level of three times it's normal price during a bidding mechanism, then the user whose bid reached that level first might then qualify for removal of the biddable option in order to be able to rely on that reservation becoming permanent again to that successful high bidder. Allowing for biddable services may be regulated in order to prevent abuse or unfair practices. Certainly, though, the biddable option for services greatly enhances the ability of a service network to accommodate over-saturation of users, according to whatever rules it adopts other than first come- first served, as is the normal rule for most services. Use of biddable options for services may actually create increased customer or user loyalty through creative bonus or reward systems for both the successful and the unsuccessful bidders.

Accordingly, this invention enables another novel business method for real-time bidding among potential users of a service. Although a lodging industry service is used as an example, the invention applies to various industries and services. In the lodging industry it may be possible for a service provider to withhold or optionally designate a certain number of hotel rooms and related services for qualified bidding according to certain rules. For example, if user #1 had a reservation for a biddable hotel room, and user #2 wanted to pay a greater incremental amount than user #1 for

that room for the same or overlapping time period, then user #2 could obtain the preferential right to the room, subject to certain fair trade rules. The bidding would occur automatically without the users being involved. In exchange for being outbid, user #1 might receive nothing further or he might receive credits, discounts or other items of value- including automatic alternate booking and notification or preferential bidding rights in the future. However, user #2 might also face a bidding scenario against a user #3, subject to agreement, unless a maximum bid, surcharge, or other qualification by user #2 was met. Moreover, it may be possible with this invention for the hotel service provider to allow bidding credits to frequent users of the hotel or those users with a higher spending profile per stay at the hotel. These business methods optimize utilization of services by exploitation of the instantaneous reservation system and methods disclosed herein, while also providing valuable services to users of the invention never experienced before.

In addition to the data and the data flow discussed above, there are various new uses for this technology which occur as a result of the underlying inventions disclosed herein. Generally, the technical innovations referred to herein create knowledge enhanced value, integration enhanced value, utilization enhanced value, and timing enhanced value. These value enhancements in turn enable previously unknown services and products to be provided to various consumers, such as service providers, travelers, business people, and others. When previously inaccessible or non-useable information of high relevance regarding user desires and service availabilities is rendered instantly available and in appropriate structure or format, then the above technical effects, advantages, and contributions are made possible. As such, the technical advantages and contributions of Applicants is realized.

While the invention has been described herein using the examples of hotel room, restaurant, automobile or other travel, and similar services, it is understood that the invention may have broader applications to other services, including location-based services, requiring a prompt or changeable reservation. For example, this may include online access to another service, and the below-listed claims are written inclusively to encompass such broad possible applications consistent with the prior art, as it may apply.

The invention thus relates to multiple types of technologies integrated to support an infrastructure of network communications for optimizing the use of

available services and user needs, with great speed and accuracy. Indeed, this unique combination of technical features enables highly innovative outcomes in the form of instantaneous service matching, bidding operations, credits to users, loyalty enhancing user packages, and user assurance improvement. Overall system efficiency is improved as well through use of this new advance in information and communication technology utilization. This invention contemplates various technical means and systems and various types of methods to achieve previously unattainable goals. It is believed that these innovations and technical contributions provide a powerful combination of features and service advantages in view of the previously stated challenges to real-time effective management of user needs in the service industry, and that this has not been accomplished or realistically contemplated before by others.

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1060
1061
1062
1063
1064
1065
1066
1067
1068
1069
1070
1071
1072
1073
1074
1075
1076
1077
1078
1079
1080
1081
1082
1083
1084
1085
1086
1087
1088
1089
1090
1091
1092
1093
1094
1095
1096
1097
1098
1099
1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
1114
1115
1116
1117
1118
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128
1129
1130
1131
1132
1133
1134
1135
1136
1137
1138
1139
1140
1141
1142
1143
1144
1145
1146
1147
1148
1149
1150
1151
1152
1153
1154
1155
1156
1157
1158
1159
1160
1161
1162
1163
1164
1165
1166
1167
1168
1169
1170
1171
1172
1173
1174
1175
1176
1177
1178
1179
1180
1181
1182
1183
1184
1185
1186
1187
1188
1189
1190
1191
1192
1193
1194
1195
1196
1197
1198
1199
1200
1201
1202
1203
1204
1205
1206
1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230
1231
1232
1233
1234
1235
1236
1237
1238
1239
1240
1241
1242
1243
1244
1245
1246
1247
1248
1249
1250
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1270
1271
1272
1273
1274
1275
1276
1277
1278
1279
1280
1281
1282
1283
1284
1285
1286
1287
1288
1289
1290
1291
1292
1293
1294
1295
1296
1297
1298
1299
1300
1301
1302
1303
1304
1305
1306
1307
1308
1309
1310
1311
1312
1313
1314
1315
1316
1317
1318
1319
1320
1321
1322
1323
1324
1325
1326
1327
1328
1329
1330
1331
1332
1333
1334
1335
1336
1337
1338
1339
1340
1341
1342
1343
1344
1345
1346
1347
1348
1349
1350
1351
1352
1353
1354
1355
1356
1357
1358
1359
1360
1361
1362
1363
1364
1365
1366
1367
1368
1369
1370
1371
1372
1373
1374
1375
1376
1377
1378
1379
1380
1381
1382
1383
1384
1385
1386
1387
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
1399
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1410
1411
1412
1413
1414
1415
1416
1417
1418
1419
1420
1421
1422
1423
1424
1425
1426
1427
1428
1429
1430
1431
1432
1433
1434
1435
1436
1437
1438
1439
1440
1441
1442
1443
1444
1445
1446
1447
1448
1449
1450
1451
1452
1453
1454
1455
1456
1457
1458
1459
1460
1461
1462
1463
1464
1465
1466
1467
1468
1469
1470
1471
1472
1473
1474
1475
1476
1477
1478
1479
1480
1481
1482
1483
1484
1485
1486
1487
1488
1489
1490
1491
1492
1493
1494
1495
1496
1497
1498
1499
1500
1501
1502
1503
1504
1505
1506
1507
1508
1509
1510
1511
1512
1513
1514
1515
1516
1517
1518
1519
1520
1521
1522
1523
1524
1525
1526
1527
1528
1529
1530
1531
1532
1533
1534
1535
1536
1537
1538
1539
1540
1541
1542
1543
1544
1545
1546
1547
1548
1549
1550
1551
1552
1553
1554
1555
1556
1557
1558
1559
1560
1561
1562
1563
1564
1565
1566
1567
1568
1569
1570
1571
1572
1573
1574
1575
1576
1577
1578
1579
1580
1581
1582
1583
1584
1585
1586
1587
1588
1589
1590
1591
1592
1593
1594
1595
1596
1597
1598
1599
1600
1601
1602
1603
1604
1605
1606
1607
1608
1609
1610
1611
1612
1613
1614
1615
1616
1617
1618
1619
1620
1621
1622
1623
1624
1625
1626
1627
1628
1629
1630
1631
1632
1633
1634
1635
1636
1637
1638
1639
1640
1641
1642
1643
1644
1645
1646
1647
1648
1649
1650
1651
1652
1653
1654
1655
1656
1657
1658
1659
1660
1661
1662
1663
1664
1665
1666
1667
1668
1669
1670
1671
1672
1673
1674
1675
1676
1677
1678
1679
1680
1681
1682
1683
1684
1685
1686
1687
1688
1689
1690
1691
1692
1693
1694
1695
1696
1697
1698
1699
1700
1701
1702
1703
1704
1705
1706
1707
1708
1709
1710
1711
1712
1713
1714
1715
1716
1717
1718
1719
1720
1721
1722
1723
1724
1725
1726
1727
1728
1729
1730
1731
1732
1733
1734
1735
1736
1737
1738
1739
1740
1741
1742
1743
1744
1745
1746
1747
1748
1749
1750
1751
1752
1753
1754
1755
1756
1757
1758
1759
1760
1761
1762
1763
1764
1765
1766
1767
1768
1769
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1780
1781
1782
1783
1784
1785
1786
1787
1788
1789
1790
1791
1792
1793
1794
1795
1796
1797
1798
1799
1800
1801
1802
1803
1804
1805
1806
1807
1808
1809
1810
1811
1812
1813
1814
1815
1816
1817
1818
1819
1820
1821
1822
1823
1824
1825
1826
1827
1828
1829
1830
1831
1832
1833
1834
1835
1836
1837
1838
1839
1840
1841
1842
1843
1844
1845
1846
1847
1848
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858
1859
1860
1861
1862
1863
1864
1865
1866
1867
1868
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
2097
2098
2099
2100
2101
2102
2103
2104
2105
2106
2107
2108
2109
2110
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2122
2123
2124
2125
2126
2127
2128
2129
2130
2131
2132
2133
2134
2135
2136
2137
2138
2139
2140
2141
2142
2143
2144
2145
2146
2147
2148
2149
2150
2151
2152
2153
2154
2155
2156
2157
2158
2159
2160
2161
2162
2163
2164
2165
2166
2167
2168
2169
2170
2171
2172
2173
2174
2175
2176
2177
2178
2179
2180
2181
2182
2183
2184
2185
2186
2187
2188
2189
2190
2191
2192
2193
2194
2195
2196
2197
2198
2199
2200
2201
2202
2203
2204
2205
2206